

**SCARUS GHARDAQENSIS, N.S.P., A NEW PARROTFISH  
(PISCES, SCARIDAE) FROM THE RED SEA, WITH A NOTE  
ON SEXUAL DICHROMATISM IN THE FAMILY**

by

Mohamed Ihab BEBARS (1)

**Abstract.** — A new species of parrotfish (Family Scaridae) from the Red Sea is here described. The problem of sexual dichromatism is discussed. On the basis of a histological study of gonads, the existence of protogynous hermaphroditism in the family is questioned, at least for the Red Sea species.

**Résumé.** — L'auteur décrit une nouvelle espèce de Scaridae de la Mer Rouge. Le problème du dichroïsme est évoqué, et sur la base d'une étude histologique, l'existence d'un hermaphroditisme protogynique est mise en question, au moins pour les Scaridae de la Mer Rouge.

Fishes of the family Scaridae are amongst the most important elements of the coral reef environment. However the systematics and the biology of this group of fish are poorly known. The Red Sea is, in this respect, one of the least studied areas, although knowledge of these fishes goes back to the time of Forsskal.

A research programme was therefore undertaken by the Institute of Oceanography and Fisheries of Al-Ghardaqa Red Sea, Egypt, for studying the systematics of this family and the biology of the commonest species in the area, viz. *Scarus harid harid* Forsskal. During this study twelve specimens of an undescribed species were found in the coral reefs in the vicinity of Al-Ghardaqa. The species is here described following the plan and sequence commonly adopted for this family of fishes.

---

(1) Institute of Oceanography and Fisheries, Al-Ghardaqa and Alexandria, Egypt.  
Temporary address : Laboratoire d'Hydrobiologie, Université des Sciences et Techniques du Languedoc, 34060 Montpellier Cédex, France.

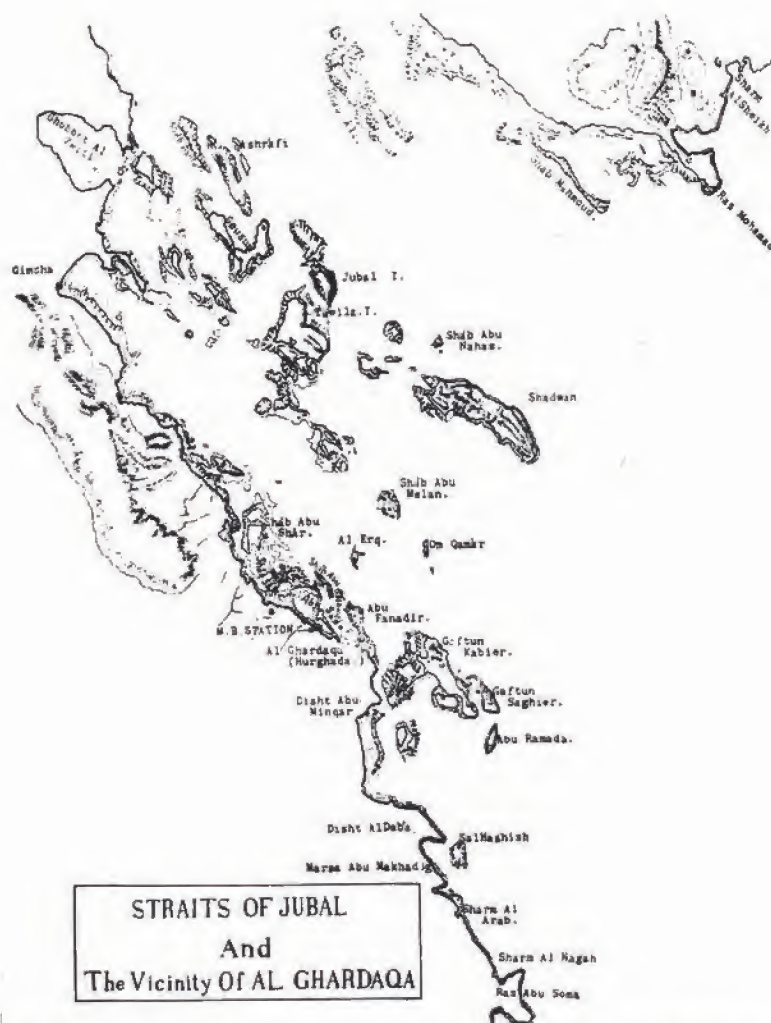


Fig. 1. — Map of straits of Jubal and the vicinity of Al-Ghardaqa, showing the Institute of Oceanography and Fisheries (M.B. Station), and the adjacent coral reefs.

*Scarus ghardaquensis*, new species.

**DIAGNOSIS.** — The species is characterized by having 4 median predorsal scales and two rows of scales on the cheek; the dorsal row comprises six scales in each of the twelve specimens collected, while the second or ventral row comprises five scales in 10 specimens and 4 in two fishes. The pectoral fin have 11, 12 or 13 rays, the spines being slender and often flexible. The lips do not quite cover the teeth. The dental plate is greenish with a white edge. Two canines may be present on each side of the upper jaw. The nostrils are minute, the anterior one is slit-like, the posterior is rounded. The dorsal lateral line has 18 - 19 scales, while the ventral line has 7 or 8 scales.

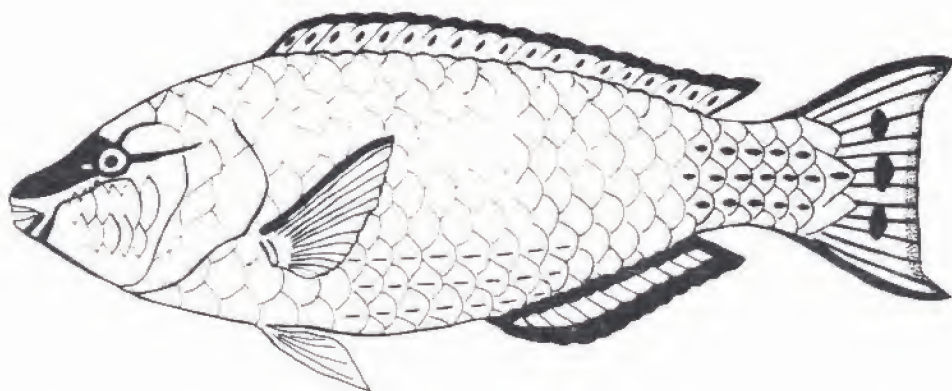


Fig. 2. — Diagrammatic representation of *Scarus ghardaquensis*, showing the important blue markings.

**COLORATION.** — The upper lip is broadly pink, followed by a green blotch on the dorsal part of the snout (represented in black on the illustration). The green blotch extends to the eye margin and the interorbital area. Two green bands extend from the eye posteriorly, the upper one ends shortly, and the lower extends to the edge of the operculum. The lower lip is blue followed ventrally by a pink area, posterior to which is a blue line, parallel, and equal in length, to the lower lip, and continuous with a green line running to below the eye; the cheek is pinkish. A green spot is found on each side of the blue mid-ventral line of the head. The edge of the



operculum is coloured faint pink. The scales of the dorsal part of body are green, with a brown vertical bar in the centre of each scale. The lower half of body is bluish. Three yellow lengthwise streaks extend on the belly from below the pectoral fin to about mid-length of the anal fin. The dorsal fin is pink with a blue margin. There is a green spot on the membrane between each two successive fin rays. The pectoral fin is yellowish grey with the first two spines blue. A pink line defines the base of this fin and is followed by a yellow area. The pelvic fin is bluish. The anal fin has three bands, the outer band is blue and somewhat broad, the middle is pink, and the basal is blue. The scales of the caudal peduncle are blue with a pink spot in the middle of each scale; these spots are arranged so as to form three pink streaks from the base of the caudal fin, anteriorly to a vertical line between rear of the bases of the dorsal and anal fins. The caudal fin is pinkish, with three blue spots arranged in a vertical line. The outer rays of the caudal fin, and the distal ends of the rays are blue.

**HOLOTYPE.** — 1 specimen, deposited in Museum national d'Histoire naturelle, Paris, no MNHN 1975-892, male, collected by the author at Al-Ghardaqa, Red Sea, Egypt, in July 1968.

The following precision measurements were made on the type, the data are expressed in percentage of the standard length.

Standard length . . . . .	270 mm
Length of head . . . . .	27,8
Greatest depth . . . . .	37,4
Length of snout . . . . .	11,9
Diameter of eye . . . . .	4,4
Least fleshy interorbital width . . . . .	9,3
Least preorbital width . . . . .	7,8
Postorbital length of head . . . . .	14,4
Length from tip of snout to insertion of dorsal fin . . . . .	31,9
Length from tip of snout to insertion of anal fin . . . . .	58,2
Pectoral fin length . . . . .	24,4
Ventral fin length . . . . .	18,2

**DERIVATION OF NAME.** — The name is from Al-Ghardaqa, near which the specimens have been collected.

**REMARKS.** — This new species is rare in our area, and the twelve specimens ranging from 200 to 368 mm in standard length were found to be all males, with small but

ripe gonads in June, July and August, a character distinguishing the testis of the late-appearing male phase in this family.

Dr Richard H. Rosenblatt, of the Scripps Institution (personal communication), indicates his belief that *S. ghardaqensis* is likely based on transformed females. Randall (1968, p. 218), in his account on the family Scaridae, states «There is reason to believe that the terminal-phase males are the result of sex reversal from fish that were originally female.»

However, I cannot agree with the commonly accepted belief that the late appearing male phase («terminal-phase males» of Randall, 1968) of the species of the family Scaridae is the result of sex reversal from female fishes. I have carried out a detailed and comprehensive histological study on the testes of both the primary and late appearing male phases on the twelve species of parrotfishes present in the Red Sea, and more particularly on those of *Scarus harid* and *S. sordidus*. No trace of protogynous hermaphroditism had been revealed in any of these species, including *S. ghardaqensis*. The case of the males of *S. harid* gives a clear example of the phenomenon of colour transformation in the family. The primary whitish coloured males attain sexual maturity at a standard length of about 20 cm. Brilliantly bluish coloured males of this species were first recognised among males of about 27 cm long and their frequency progressively increased so that all males acquire this colour pattern at a length of about 35 cm. Moreover, many individuals of *S. harid* in the whitish phase had been observed bearing different transitional patterns between this phase and the late-appearing bluish male phase. Those individuals had proved to be all males. Furthermore, it had been found that the size of the testis differs considerably in the two colour patterns of phases of the male. The late appearing male phase has always, even during the spawning season, a testis which is much smaller, though completely ripe, than that of the other phase.

These evidences clearly point out that, at least for Red Sea species, the parrotfishes acquire, besides the juvenile phase, two colour phases which cannot be correlated with the maturation of the gonads. Thus, immature fishes have a colour pattern which is exactly the same as that of mature females throughout their life span. However, males behave differently, as they also have in mature condition the same colour pattern as that of females, but they gradually merge into another pattern having a distinct brilliant coloration. Fish of this pattern can be referred to as late appearing male. Such a colour change is probably associated with senility and the adoption of a new pattern of spawning behavior.

It may be concluded that the colour pattern of *S. ghardaqensis* described here represents the late appearing male phase of the species.

**ACKNOWLEDGEMENTS.** — I wish to express my gratitude to Prof. Dr H.A.F. Gohar, former Director of the Institute of Oceanography and Fisheries, Academy of Scientific Research and Technology, Egypt, and Professor, Faculty of Science, Cairo University; and to Dr A.F.A. Latif, Professor at the same Institute, under whose supervision this work was undertaken. I am also indebted to Dr C.L. Hubbs, Professor Emeritus of Biology, University of California, San Diego, and to Dr R.H. Rosenblatt of the Scripps Institution for reading and criticizing the manuscript.

#### REFERENCES

- FORSSKAL, P. 1775. — *Descriptiones animalium; avium, amphibiorum, piscium, insectorum, vermium quae in itinere orientali observavit, Hauniae. Post mortem auctoris edidit Carsten Niebuhr*, 20 + XXXIV + 164 p., 1 map.
- RANDALL, J.E., 1968. — *Caribbean Reef Fishes*, T.F.H. Publication, Jersey City, 318 p. 324 fig.